REMARKS/ARGUMENTS

Claims 1 to 20 are currently pending in the application. Claims 1, 2, 3 and 14 have been amended and claims 21 to 28 have been withdrawn. No new matter has been added with the current amendment.

Objection to the Specification

The Examiner objected to the disclosure at page 3, line 4 of the application as containing a typographical error, namely, the term ")T". Applicants have amended the application to read "ΔT", thereby obviating this rejection.

Objection to the Claims

The Examiner objected to claim 14 as missing the term "at" before the term "least". Applicants have amended the claim to insert the missing term, thereby obviating this rejection.

Rejections Under 35 USC §103

The Examiner rejected all the claims under 35 U.S.C. §103(a) over Peker (USPN 5866254) in view of Suresh (Fundamental of Metal-Matrix Composites) and Peker-Johnson (USPN 5288344). Applicants respectfully traverse this rejection in light of the newly amended claims.

The current invention is directed to a method of forming a highly dense composite material. As identified by the Examiner, the method includes the steps of:

- providing a feedstock of a bulk solidifying amorphous alloy;
- dispersing a plurality of pieces of a reinforcement material throughout the bulk solidifying amorphous alloy feedstock to form a mixture;
- densifying the mixture by applying a force to the mixture;
- cooling the densified mixture below the glass transition temperature of the bulk solidifying amorphous;
- reheating the solidified composite mixture to a forming temperature;

- forming the reheated composite mixture into a desired shape; and
- quenching the reheated mixture to an ambient temperature to form an amorphous alloy-matrix composite material.

As the Examiner notes in the Office action of October 16th, a number of these steps are to be found in the Peker ('254) patent, which is also directed to making amorphous alloy composites; however, as explained in the background to the current application, and as also acknowledged by the Examiner, the current invention is not just directed to making amorphous composite materials, but to making very dense high-quality amorphous composite materials. (See, e.g., Specification, page 1, lines 17 to 30.) Indeed, the current specification teaches a number of methods of increasing the density of these composite materials. One of these methods is to apply a simple densification pressure to infiltrate or force the molten alloy material into the interstices between the pieces of composite materials. Although the Examiner acknowledges that such a densification step is never described in the Peker ('254) patent, he uses teachings from the Suresh publication to address the apparent deficiencies in the Peker ('254) patent.

However, the current specification also recites a number of additional steps to further improve the final dense composite material formed form the inventive process. One such step is to use interrelated timing and heating conditions when densifying and shaping the product to ensure the highest possible quality and shape-ability of the final product. Specifically, as now claimed, the application further requires that the reheating step of the inventive process be conducted "for a period of time less than the densification time" and "wherein the forming temperature is at least 50 °C higher than the densification temperature." (See, amended claim 1, above.) As discussed in the specification, using such a reheating step to shape the alloy material allows for the production of near-net shape composite parts with aspect ratios and dimensions far

greater than those obtainable through conventional methodologies. (Specification, page 8, lines 23 to page 9, line 18.)

Nowhere do either the Peker ('254) or Suresh patents ever describe, teach or even suggest such a specific relation between the times and temperatures used for the densification and reheating steps. Indeed, because Suresh is focused on making conventional composites not amorphous composites the paper never even discusses the need for a separate reheating step after the densification step. And, though the Peker ('254) patent does disclose an optional reheating step, because it is not focused on obtaining highly dense materials, it does not ever specifically teach a separate densification step. As a result, neither of the references ever makes a connection between the conditions used during densification and those used during reheating to improve the quality of the final composite material. Nor does the Peker-Johnson ('344) patent add any additional information on this subject, being focused as it is on a discussion of the composition of some exemplary amorphous alloy materials.

Accordingly, Applicants would submit that one of ordinary skill in the art, having read the combined disclosures of the Peker ('254), Suresh and Peker-Johnson ('344) references would not have had sufficient teaching to modify either of the composite formation methods described in the Peker ('254) or Suresh disclosures by carefully controlling the relative process times and temperatures of the densification and reheating steps, as required by the amended claims, to obtain the improved dense amorphous composite formation process of the current invention. As such, Applicants would request reconsideration and withdrawal of this rejection.

Conclusion

In conclusion, Applicants have complied with each of the Examiner's requested amendments and respectfully submit that the application should now be in condition for receipt of a Notice of Allowance.

Respectfully submitted,

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